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Transnational Climate Governance Initiatives: Designed for Effective Climate Change Mitigation?

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Abstract

The Paris Agreement of December 2015 set a highly ambitious target for global climate change mitigation, but it remains unclear how it will be reached and the individual countries' pledges do not add up to the overall target. Can transnational climate governance initiatives be expected to fill the gap? We assess 109 such initiatives based on four design criteria: existence of mitigation targets, incentives for mitigation, definition of a baseline, and existence of a monitoring, reporting and verification procedure. About half of the initiatives do not meet any of these criteria and not even 15% satisfy three or more. Many initiatives were created only for the purpose of networking. Orchestration by national governments and international organizations increases the number of criteria met. On average, the mitigation focus of new initiatives was highest during the "heyday" of the international climate policy regime between 2005 and 2010. While mitigation-oriented entrepreneurial initiatives are generally started only in response to existing regulation, sub-national governments and NGOs show some attempts to go beyond that and compensate for insufficient regulation at the national and international level. Yet, given the low overall quality assessment, transnational climate governance initiatives cannot be expected to fill the "mitigation gap".

Keywords: International climate policy, transnational governance, effectiveness, mitigation, institutional design

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The Paris Agreement adopted by all member countries of the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015 sets a highly ambitious global target for a limitation of global warming to "well below" 2°C from preindustrial levels (UNFCCC 2015a), specifying that greenhouse gas emissions and sinks shall reach a balance in the second half of the 21st century. Thus massive reductions of greenhouse gas emissions are required in the next decades. However, the Agreement builds on government mitigation pledges (Nationally Determined Contributions, NDCs) that, for developing countries, largely depend on the availability of external funding. The existing pledges are estimated to imply a temperature increase of at least 2.7°C by 2100 (Climate Action Tracker 2015; UNEP 2015a; UNFCCC 2015b). While the Agreement foresees a "ratcheting up" of NDCs every five years, it remains to be seen whether this process can close the emissions gap.

The UNFCCC can be seen as being part of a larger regime complex for climate change (Keohane and Victor 2011). Hence achieving mitigation depends not only on the UNFCCC. High hopes have been put in transnational climate governance (TCG) initiatives including subnational entities, private sector associations and individual firms, as well as NGOs. In 2014 UN Secretary-General Ban Ki-moon called a special summit inviting world leaders from finance, business, and civil society along with governments "to galvanize and catalyze climate action" (United Nations 2014). Similarly, in the run-up to the decisive 2015 UNFCCC conference in Paris, French President François Hollande underscored the important role of TCG initiatives (Hollande 2015:85).

A rich strand of academic literature exemplified by Bulkeley et al. (2014) examines the rise of these initiatives in recent years. However, it is unclear so far whether TCG initiatives are effective in reducing emissions (Stavins, Zou, Brewer, Conte Grand, den Elzen, Finus, Gupta, Höhne, Lee, Michaelowa, Paterson, Ramakrishna, Wen, Wiener, Winkler, Bodansky, Chan, Engels, Jaffe, Jakob, Jayaraman, Leiva, Lessmann, Newell, Olmstead, Pizer, Stowe, Vinluan 2014). Pinkse and Kolk (2009) stress the complexity of measuring outcomes. A number of papers suggest that effectiveness depends on complementarity with national and/or international regulation. Green (2013:2), for instance, describes the UNFCCC's Kyoto Protocol as a "coral reef" that attracts a number of interesting complementary initiatives. Pfeifer and Sullivan (2008) see government regulation as crucial to send signals to investors that are then reflected in a TCG initiative. Companies want to achieve their commitments in an efficient way and thus engage in TCG initiatives once national level mitigation policy instruments have been established. Similar arguments about complementarities are made in the general literature on TCG initiatives (Potoski and Prakash 2005; Berliner and Prakash 2014) and by some of the papers in this issue. TCG initiatives may also influence government regulation, such as private carbon market standards that lead to an improvement in mandatory carbon market regulation (Hoffmann 2011). A substantial literature examines the general context in which such voluntary programs – in the area of climate change

mitigation and beyond – can be successful (Baccaro and Mele 2011; Baranzini and Thalmann 2004; Berliner and Prakash 2015; Cashore, Auld, Bernstein and McDermott 2007; Darnall and Kim 2012; DeLeon and Rivera 2009; Morgenstern and Pizer 2007; Overdevest 2010; Overdevest and Zeitlin 2014).

We directly examine which contribution TCG initiatives can be expected to make to climate change mitigation. Our first contribution is the development of a specific set of criteria that can be used for that purpose covering the whole range of TCG initiatives. As it is too early for an evaluation of their effectiveness, we focus on their design and the direct mitigation benefits that can be expected thereof. In line with Koremenos, Lipson and Snidal (2001a:767, 2001b:1079) we believe that design is highly relevant for later effectiveness and that therefore, the study of the initiatives' design already provides us with important elements for their evaluation. Our second contribution is the empirical examination of the conditions under which an initiative is more likely to fulfill the above criteria. In this context, we specifically consider the initiatives' membership composition (entrepreneurial, NGOs, sub-national), and their complementarity to national and international regulation. Eventually, we can shed some light on the question whether the high expectations regarding the role of TCG initiatives for climate change mitigation can be fulfilled. Overall our results are rather sobering, but certain types of initiatives show promise in complementing existing regulation.

In principle, TCG initiatives can contribute to the ambitious target of the Paris Agreement in two ways: First, they can react to national or related international regulation by, simply responding to these regulations promoting the concrete implementation of corresponding measures, and thereby helping governments to reach their NDCs (or, prior to the Paris Agreement, their Kyoto targets). We refer to these initiatives as "*complementary initiatives*". Second, they can pro-actively address the lack of national government ambition, and thereby contribute to closing the current gap between the sum of NDCs and the mitigation needed to reach the Paris Agreement target. We refer to these initiatives as "*stand-alone initiatives*". Despite their greater independence, stand-alone initiatives do not necessarily need to be more promising than complementary ones.

We expect these two types of initiatives to be driven by different motivations. Existing regulation may provide strong incentives for the private sector to develop innovative strategies to efficiently handle the respective requirements. This may lead to business-driven, complementary TCG initiatives. Other actors like NGOs may focus more on filling the gaps by pushing for reforms where existing regulation is lacking or appears to be insufficient. The underlying motivation should play a role for the design of these initiatives, and hence we will systematically distinguish between

complementary and stand-alone initiatives when assessing whether and under which conditions they meet our key criteria for an effective mitigation-oriented institutional design. This provides important insights regarding the interaction of different institutions within the climate change regime complex, and regarding the implications of this interaction for mitigation.

Our assessment of 109 initiatives started between 1990 and mid-2015 finds that less than 15% satisfy at least three of the following four criteria of a mitigation-oriented design: a) existence of mitigation targets, b) incentives for mitigation, c) definition of a baseline and d) existence of a monitoring, reporting and verification procedure.

Through multivariate econometric analysis we show that entrepreneurial initiatives require regulation in order to have a mitigation-oriented design, while initiatives developed by sub-national governments and NGOs are more likely to target mitigation beyond existing national-level policies. Overall, we conclude that the lack of mitigation ambition on the government level cannot be "made up" by mitigation achieved through transnational climate governance initiatives, as too few of the latter have a mitigation-oriented design.

Measuring the Mitigation Orientation of TCG Initiatives

Many studies on transnational climate governance simply look at the emergence of new initiatives. An analysis of their expected or actual mitigation effectiveness is rare. This may lead to an overly optimistic picture. But how to assess the initiatives' potential to actually contribute to mitigation?

Conceptual Difficulties

Measuring an initiative's mitigation contribution and thereby distinguishing effective from ineffective (or less effective) initiatives is a difficult task (Chan and Pauw 2014; Pinkse and Kolk 2009). It is rarely possible to directly observe effects of transnational initiatives or voluntary programs more generally. Exceptions are possible only when examining a single program on the basis of very detailed information of the mitigation action of its individual members. A convincing example is the analysis of the Global Compact by Berliner and Prakash (2015). Assessing the impact of a program further requires the specification of a plausible counterfactual or baseline. For instance, while we might be able to measure that emission reduction projects under the "Gold Standard" are indeed more convincing than projects that do not fulfill this standard, how do we know that these convincing projects would not have been better than other projects even without the existence of the standard? This identification problem plagues the literature of the

effectiveness of international regimes more generally (see Helm and Sprinz 2000:633ff; Tetlock and Belkin 1996:3, Young 1999).

We solve this problem by focusing our analysis on the assessment of the different initiatives' institutional design. Thus, we can examine a broad range of initiatives and make them comparable with the view to a single objective, namely mitigation, the key goal of the Paris Agreement towards which TCG initiatives must contribute. From a results chain perspective, a mitigation-oriented design can be considered as an "output", the initial step towards effectiveness at the outcome or impact level. Assessing outputs is much less ambitious than assessing outcomes or impact, and it may entail the risk to overestimate success (Young 2011). Indeed the evaluation literature based on results chain frameworks typically considers the relevant outputs as a necessary, but not a sufficient condition for outcomes and impact. Therefore, we look at the minimum requirements for possible effectiveness.

Admittedly, this perspective ignores unexpected or unintentional effects. Scholars from a social-constructionist school of thought discuss several theoretical mechanisms that may lead to an impact beyond initial intentions. They suggest that private initiatives, even if not initially designed for public good benefits may eventually develop dynamics that could still yield such benefits in the long run driven by the interaction between different members within the initiative, or between members and other actors such as national governments and consumers (for example Baccaro and Mele 2011; Cashore, Auld, Bernstein and McDermott 2007; Christensen, Morsing and Thyssen 2013; Haack, Schoeneborn, and Wickert 2012; Overdevest 2010; Overdevest and Zeitlin 2014). However, so far this literature tends to find only very limited empirical evidence for these processes to work in practice (Baccaro and Mele 2011; Cashore et al. 2007). Some exceptions seem to exist for specific areas and under specific conditions such as strengthening consumer demand that induces competition between firms (Overdevest 2010 and Overdevest and Zeitlin 2014 for forestry).

We are thus rather skeptical about the significance of such positive dynamics in our context and doubt the potential of TCG initiatives without a mitigation-oriented design to develop in a way that generates significant mitigation. At least without considerable changes in external conditions (an exogenous rise in consumer demand or stronger regulation), whose effects would, however, not be confined to existing TCG initiatives, such developments seem to be rather unlikely. Therefore, we believe that a convincing mitigation-oriented design can indeed be considered as a minimum requirement for the later mitigation effectiveness of TCG initiatives.

What constitutes such a design? A potential trade-off between stringency and participation is frequently discussed in the institutional design literature (for example Bernauer, Kalbhenn, Koubi and Spilker 2013). The basic idea is that both stringency and broad-based participation are important, but that emphasis on the former tends to reduce the latter. Hence, the most stringent initiatives are not necessarily the most effective ones. Clearly, the optimum can neither lie at very low stringency (if there are no requirements, there will be no effect), nor at very low participation (if there are no participants, there will equally be no effect), but must be somewhere in between. This implies that for sufficiently basic stringency criteria, enhancing stringency will lead to higher effectiveness.[1]

The same argument can be made for the potential trade-off between stringency and the number of TCG initiatives. Having a large number of different initiatives may be beneficial for the effectiveness of the regime complex as a whole, and high stringency may limit the number of initiatives. Yet, again, the negative effect on the number of initiatives will only dominate the positive direct effect of stringency beyond a certain point.

We will hence formulate basic design criteria, which we consider necessary for any plausible effect on mitigation.

Basic Design Criteria for Effective Mitigation

Our ability to build on existing approaches in this context is very limited. To the best of our knowledge, no comprehensive classification of TCG initiatives with respect to their mitigation potential has been provided so far. UNEP (2015b) has come closest to this objective and provides a clear and credible approach, but by limiting the assessment to the analysis of mitigation targets the final indicator can be calculated only for a small subset of 15 initiatives. Similarly, Hsu, Moffat, Weinfurter and Schwartz (2015) also focus on mitigation targets (announced either by the initiatives or by their members). While this focus on targets allows the authors to compute the potential volume of emission reductions, it ignores other pathways of climate change mitigation that are not directly quantified within the initiatives, for example through the use of financial incentives. Research initiatives to go beyond these initial classifications are under way, but not yet

[1] Mathematically, this can be illustrated as follows. Let mitigation (M) be given by $M=x(m)\cdot m$, where m is mitigation achieved per member, and x is the number of members. x is a negative function of m. For simplicity, let it be a linear function, , $x=a-bm$, with a and b being some positive parameters. Overall mitigation M can thus be rewritten as: $M=(a-bm)\cdot m$ or $M= am-bm^2$.
We obtain the optimum by maximizing M over m:
$M'(m)=a-2bm=0 \Rightarrow m^*=a/2b$.
The optimal level of stringency is m*. As long as stringency is below m*, this is suboptimal even though lesser stringency increases membership. Only beyond m*, greater stringency reduces effectiveness because the negative effect on membership overrides the positive direct effect of stringency.

fully developed and applicable (Galvanizing the Groundswell of Climate Actions 2015; GDI and LSE 2015).

It appears to us that including other criteria beyond the definition of a mitigation target is essential to do justice to the different types of initiatives. As stated above, financial incentives may also contribute to effective emission reductions, at times even more than the definition of targets. The Pilot Auction Facility, for example, invites project developers to participate in auctions and thereby selects and funds the most efficient mitigation projects. In addition, monitoring, reporting and verification (MRV) devices can raise transparency and thereby create competition for best practice, at least as far as this is valued by the population. An example is the International Council of Local Environmental Initiatives (ICLEI), a city network that supports inventories of its members' emissions so that they become comparable within and across countries. This may have some effect even without the definition of targets. Finally, the definition of a baseline is important to distinguish any kind of mitigation activities from business as usual.

We hence consider four criteria that should be met for any initiative to plausibly contribute to mitigation action: the definition of a mitigation target, the introduction of financial incentives, the specification of a baseline, and the definition and use of MRV. Note that these criteria are truly basic in that we do not further specify any requirements regarding the stringency of the target, the volume of the financial incentives, or any special methodological requirements regarding the calculation of the baseline or the stringency and robustness of the MRV system. We only consider whether there is *any* mitigation target, incentive, baseline, or MRV.

We note a substantial complementarity between these criteria. In fact, a target without verification may not have any effect, no matter how ambitious the announcement. Similarly, financial incentives may not generate the expected effects if there is no monitoring – moral hazard would undermine mitigation. And the most serious monitoring may not guarantee any improvement beyond business as usual if the latter is not assessed. For any convincing initiative we would hence expect those criteria to be met simultaneously. A stand-alone initiative should ideally meet all four criteria; for complementary initiatives, either a mitigation target or a financial incentive may be sufficient to generate mitigation benefits. For instance, the target may be provided through national commitments made under the Kyoto Protocol, so that individual initiatives would not need to define such targets. However, even initiatives intended to complement rather than to substitute for domestic and international regulation are much more credible when several criteria are fulfilled.

Figure 1 presents the distribution of initiatives according to the number of criteria met. It shows that only a single initiative meets all four criteria while almost half of the initiatives do not meet any of them. 25% of the initiatives meet only one of the four criteria, 15% two, and 13% three. Given the complementarities discussed above, we must conclude that no more than 14% of all 109 TCG initiatives show a design convincingly directed at climate change mitigation, and only one may be considered convincing as a stand-alone initiative. Especially since there are no requirements regarding the level of ambition underlying the individual design criteria, the overall distribution provides little justification for the high hopes expressed regarding their potential to support governments in meeting their mitigation objectives, or to even go beyond that. The shares of initiatives fulfilling the individual criteria are: 46% for MRV, 27% for a baseline, 13% for incentives, and 11% for a mitigation target (see Online Appendix I, Table A1).

Figure 1 about here

Not surprisingly, this sobering result regarding the design characteristics of TCG initiatives directly reflects their purpose. Table 1 provides an overview that illustrates this point: While most initiatives are mitigation-related in principle, many focus on networking, and direct benefits for mitigation are not necessarily intended. Such initiatives may still be valuable for their respective purposes, but we expect a limited climate change mitigation benefit.

Table 1 about here

Theoretical Considerations

The creation of a TCG initiative with a design encouraging effective mitigation reflects the disposition of its members to actively engage in combating climate change. However, why should a rational actor want to take any serious steps towards mitigation given that true mitigation is usually costly, and so is even the mere participation in transnational networks (see Dolšak and Prakash, this volume).

In our theoretical discussion, we distinguish between three major groups of participants within TCG initiatives: The private sector (firms and business associations), sub-national governments, and NGOs. We will discuss the incentives of each of these groups and to what extent they depend on existing regulation at the national and international level. In addition, we consider the role that national governments or international organizations may have in reinforcing the incentives for creating TCG initiatives designed for effective mitigation.

Private Sector

The general literature on voluntary corporate environmental programs identifies several mechanisms that may create incentives for the private sector to participate in such initiatives. Berliner and Prakash (2014, 2015) suggest that demand for products from participating firms may be greater allowing price increases. More generally, firms can reap reputational benefits (Potoski and Prakash 2005, 2013; see also Green, this issue), directly increasing their market value. However, to ensure that reputation cannot accrue from simple window dressing, considerable transparency is required. In climate change mitigation, such transparency is not easy to achieve and may depend on national and international regulation. Furthermore, public awareness often depends on national and international government action since debates about existing or upcoming regulation, notably at UNFCCC meetings, frequently spur substantial media attention (see, for example, Michaelowa and Michaelowa 2012).

Moreover, provided there is domestic regulation, membership in a TCG initiative may signal regulatory compliance to the national authorities (for example through ISO certification of their company-internal processes) who then redirect their verification efforts towards other firms. In this case, the firms can reduce transaction costs of the verification process. This obviously hinges on the seriousness of the national verification process, including the absence of corruption (Berliner and Prakash 2014).

A similar mechanism is conceivable with respect to international regulation. For instance, to facilitate the acceptance of a project under the Kyoto Protocol's Clean Development Mechanism (CDM) that generates certified emission reductions that can be sold on the market, it may be helpful to adhere to the stricter rules of the private "Gold Standard" initiative in the first place.

Finally, firms' voluntary engagement may be based on the expectation to achieve domestic or international regulatory requirements in a more cost-efficient manner. This may be achieved by the promotion of research and development activities or by exploring first mover advantages, for example by investing in carbon funds early on to benefit of low hanging fruits, cheap and large mitigation interventions. In these cases, participation in voluntary initiatives may make sense as soon as the regulation is expected, even if it is not yet agreed upon.

All the above suggests that the private sector should have a strong incentive to respond to existing or imminent domestic and/or international greenhouse gas emissions regulation by participating in effective mitigation-oriented TCG initiatives. However, can mitigation-oriented TCG initiatives also be attractive for the private sector independently of national or international regulation?

In principle, they could if there were sufficiently high direct co-benefits, for example through information about new and efficient technologies that can reduce production costs in the medium to long term. We expect, however, that efficient technological adjustments are already partially accounted for in business as usual scenarios, and that the specific (additional) mitigation orientation of such stand-alone initiatives will thus be low, notably in comparison to initiatives created in response to existing regulation.

H1: *Stand-alone entrepreneurial TCG initiatives do not have a mitigation-oriented design.*

H2: *Complementary entrepreneurial initiatives (entrepreneurial initiatives responding to existing or imminent national or international regulation) have a stronger mitigation-oriented design than stand-alone initiatives.*

Sub-National Governments

Regarding sub-national entities such as regions or cities, we assume that the profit maximizing perspective we adopted for firms can be replaced by a utility maximizing perspectives based on public support, or, more specifically, electoral support if countries are democracies. People in specific localities may have a direct interest in climate change mitigation that is not met by regulation at the international or domestic level. In fact, in many countries in which the populations are most vulnerable to climate change, domestic regulation has no potential to solve the problem, because of poverty and lack of industrialization there are hardly any local emissions that could be reduced. Transnational cooperation of sub-national entities such as cities and regional governments may then provide an alternative avenue to push the agenda. The effectiveness of transnational cooperation created on this basis will, of course, depend on the willingness of high greenhouse gas emitters to also participate in such initiatives and to increase their mitigation efforts. If high emitters are not willing to make such serious efforts and this can be anticipated by developing countries, it does not make much sense for the latter to promote such initiatives either.

The key question therefore is whether people in highly emitting regions – possibly without much direct benefit from climate change mitigation – may support local or regional governments engaging in TCG initiatives. This could happen because they generally value the protection of the environment and/or care for people more directly concerned in other world regions or in later generations. Co-benefits of greenhouse gas mitigation such as reduction of health costs due to local air pollution can also provide a motivation, notably in emerging economies. This can lead to special

efforts by some sub-national governments to go beyond required regulation or to even try to compensate for national and international policies that are considered to be insufficient.

At the same time, the literature also suggests positive relationships between national environmental policies, national regulation, and the engagement of sub-national entities (Andonova, Hale and Roger 2014). By highlighting the role of domestic NGOs on the engagement of cities, Dolšak and Prakash (this issue) also point at the link between national and sub-national policy support. Moreover, arguing that domestic mitigation policy instruments may untighten the sub-national units' budget constraints, Cao and Ward (this volume) provide an alternative theoretical rationale for a complementary rather than stand-alone engagement of cities and regions. However, this only applies for specific national policies that provide a direct financial reward for mitigation action.

In sum, as opposed to private firms, theoretical arguments can be made for both stand-alone and complementary activities of sub-national entities. We consider that notwithstanding the above arguments, their engagement for mitigation-oriented design of TCG initiatives may be even greater for stand-alone initiatives because in many areas, regulation at higher levels will already fulfill the needs of the local constituencies. Except for the rationale based on special financial incentives provided by national governments, even in the case of complementary initiatives, the argument for local or regional governments' interests to achieve mitigation eventually hinges on either altruistic preferences of the population that may be partially offset by vested interests of local industries, or on local co-benefits that tend to be relevant only up to a certain point in economic development. Beyond this point local pollutants will be reduced through the use of filters and other technical devices while greenhouse gas emissions continue to rise. Overall, this may lead to some positive, albeit not very strong incentives to participate in TCG initiatives with a convincing mitigation-oriented design.

H3*: TCG initiatives based on sub-national government membership have a mitigation-oriented design (albeit only weakly so).*

H4: *Stand-alone TCG initiatives based on sub-national government membership have a stronger mitigation-oriented design than complementary initiatives.*

NGOs

NGOs are usually assumed to be intrinsically motivated for climate change mitigation driven by environmental and distributional norms. As people self-select into different groups of actors, it is indeed plausible that NGO members have particularly strong preferences in this respect. This should induce them to promote both, transnational activities complementary to existing regulatory policies, and stand-alone initiatives going beyond current regulation. In order to be most effective, they might even wish to engage primarily in stand-alone activities attempting to move things ahead where government has not (yet) taken any responsibility.

However, NGOs work under budget constraints, just like any other actors considered here. Their budget is usually composed of private donations and public subsidies. This is why their activities also depend on the valuation by the general public and different levels of government. If a topic runs out of fashion, NGO resources in this area may dry up. This is why even for NGO-driven initiatives, the stand-alone potential must be considered as rather limited.

It should also be noted that NGOs cannot themselves reduce emissions, but only induce others to do so. As a consequence there are no TCG initiatives only consisting of NGOs, and in the TCG initiatives where they are present, they tend to focus on consulting or knowledge sharing. While their inclusion might signal a willingness of all actors to strive for climate change mitigation, their actual influence on the design of the initiative may be limited.

H5: *TCG initiatives with NGO membership have a mitigation-oriented design (albeit only weakly so).*

H6: *Stand-alone TCG initiatives with NGO membership have a stronger mitigation-oriented design than complementary initiatives.*

Orchestration by International Organizations and National Governments

Finally, we consider international organizations and national governments that initiate and shape TCG initiatives. While 'initiating' refers to the influential role as a founding member, 'shaping' refers to an influence over the initiative after its creation, either directly or through funding. They are considered as the two dimensions of 'orchestration', which is examined in detail by Hale and Roger (2014).

In our view, orchestration should be positively related to a design for TCG initiatives that effectively addresses mitigation. While national governments can contribute funding and establish matching national policies (for example through the recognition of certain standards for offset

credits), international organizations can provide advice or help strengthening the coordination between members. Sometimes they also host the initiatives. Thus, the initiatives are regularly exposed to the ideas developed in the organization in which they are embedded. Since some international organizations such as the World Bank have already gained considerable experience in the field of carbon market mechanisms, they could use their influence to improve the mitigation orientation in the design of TCG initiatives.

They might use their influence even more at times when their climate-related preferences are not matched by corresponding progress at the international level. As illustrated by the example of the Ban Ki-moon summit above, during the pre-Paris lack of progress at the UNFCCC level, there was a clear attempt to mobilize stand-alone bottom-up initiatives. This suggests a general tendency of increased initiating and shaping activities in recent years, possibly also with an effect on the mitigation-related design of these initiatives. As a consequence, the role of orchestration might be even greater for stand-alone initiatives than for complementary ones.

H7: *TCG initiatives orchestrated by international organizations and national governments have a mitigation-oriented design.*

H8: *For stand-alone TCG initiatives' orchestration has a stronger positive effect on mitigation-oriented design than for complementary initiatives.*

Empirical Analysis

We test these hypotheses for a total of 109 initiatives. They include 65 initiatives from the Roger et al. (2015) dataset. From the original data, 10 observations have been dropped because they either constitute sub-initiatives of initiatives already taken into account, do not meet Hale and Roger's (2014) inclusion criteria for TGC initiatives (according to the latest information available on the respective websites), or do not provide any information at all so that not even their mere existence can be ascertained. At the same time, we update the dataset by including 44 additional initiatives, mostly for the period from 2010 onwards when the coverage of the original dataset ends. To select these initiatives, we follow the original codebook used by Roger et al. (2015) based on the definitions developed in Andonova, Betsill and Bulkeley (2009) that were first applied in Bulkeley et al. (2012, 2014).

Operationalization

Let us first define our dependent variables. Based on our four basic criteria, several indicators could be used. Given their complementarity, we would ideally have constructed an indicator variable for those initiatives that meet all four criteria. However, as this is the case only for a single initiative, we provide alternative indicators based on lower requirements. '3 criteria met' is a dummy variable taking the value of 1 if three out of the four conditions are fulfilled, and '2 criteria met' is a similar measure for at least two criteria being met. For each of these, Figure 2 shows the number of initiatives by foundation year as well as the total number of initiatives created. The latter shows a peak after the entry into force of the Kyoto Protocol in 2005, and in 2014 due to the Ban Ki-moon summit.

Figure 2 about here

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In addition to these indicators, we use a variable for the total number of criteria met measured by adding up all criteria that are fulfilled ('sum of criteria'). Finally, we consider all the individual criteria separately. This leads to seven dependent variables that are systematically introduced in all our regression tables.

The operationalization of our explanatory variables relies partly on Roger et al. (2015) (for a discussion, see also Bulkeley et al. 2012). To distinguish the actor groups, we use their categories 'entrepreneurial' (non-state actors played the leading role in initiating the initiatives) and 'transgovernmental' (only sub-state actors were responsible for their creation). While the definition of entrepreneurial initiatives does not exclude NGOs, in practice, this category is dominated by the private sector (firms and business associations). To specifically analyze the role of NGOs, we code an additional indicator variable 'NGO members' for TCG initiatives including NGOs. NGOs usually do not create TCG initiatives (although there are some exceptions), but they may be members in initiatives created by others, and thereby able to exert some influence. Note that only the first two categories (entrepreneurial and transgovernmental) are mutually exclusive. At the same time, some initiatives do not fall in any of the categories, for example when they are initiated by international organizations and do not have NGO membership.

For orchestration, we supplement the variables for initiating and shaping from the Roger et al (2015) database by the additional indicator 'Depends on gov.', which captures the initiation of the initiative by national governments (and in exceptional cases some other form of direct influence of government policy, without participation of the government in the initiative).

Our concept of stand-alone versus complementary initiatives is measured in relation to the existence of country targets ('Country target') representing national regulation,[2] and the existence of a functional legally binding international regime ('Kyoto operational') representing international regulation. This period of effective international regulation (2005-2009) is contrasted with the period 'Post Copenhagen' (after 2009) where it became clear that the Kyoto Protocol had no long-term future. A TCG initiative created in a country with a country target or during the period in which the Kyoto Protocol was operational is considered as complementary, otherwise as stand-alone.

We systematically control for those initiatives whose main purpose is adaptation ('Adaptation focus'), as well as for the membership structure ('Structure') of the initiative varying from 1 (centralized) to 3 (decentralized) thereby capturing the specificities of networking initiatives. In addition, we control for the initiatives' starting year ('Year') and for cases, in which there is no single founding country because the initiative was set up by international organizations, the World Bank ('WB'), the European Union ('EU') or other international organizations ('INT'). In additional analyses presented in the online appendix, we further control for economic, political and emission-related characteristics of the founding country.

Results

Tables 2-4 present the results from heteroscedasticity-consistent linear regression models (see Online Appendix II for a methodological discussion). In Table 2 the focus is on complementary versus stand-alone initiatives with respect to national regulation. In Table 3 the perspective shifts to international regulation. Finally, Table 4 provides some more insights in the role of orchestration. The Online Appendix follows the same structure with a larger set of controls.

Throughout all models (in all tables), national governments seem to play an important role. The variable 'Depends on gov.' is one of the most robustly significant variables across all regressions. It increases the 'sum of criteria' by more than one point and raises the probability to achieve a positive score on '2 criteria met' and '3 criteria met' as well as on most of the individual criteria by over 50%. A general exception is the mitigation target. This is plausible since a country can be expected to set its mitigation target through other means, so that this is not what governments would primarily encourage TCG initiatives to do. Among the other individual criteria, the effect is the smallest (and least significant) for MRV – probably because generally, most

[2] Country targets have to meet some minimum stringency criteria as defined by Ecofys et al (2014) to be counted here. See the online Appendix .

initiatives focus on this aspect. Overall, however, this result suggests a strong effect of national government initiation and thereby provides some initial support for hypothesis 7.

Another variable that quite robustly shows a positive association with the mitigation focus of TCG initiatives is the existence of country targets in the founding country. Regarding the coefficient estimates for the individual criteria, the effect is at times only marginally significant or not significant at all, but the effect on the aggregated measures 'sum of criteria', '2 criteria met' and '3 criteria met' is always significant at least for one of these measures. This provides a first indication of relevant complementarities between effective TCG initiatives and national regulation. The complementarities that other authors in this volume find between the creation of new initiatives and government regulation hence also exist regarding the mitigation orientation of these initiatives.

Note that in Table 2 (and Table A2) the coefficient estimates and significance of this variable have to be interpreted differently than in the other tables as the variable also enters in different interaction terms to explore complementarity with the engagement of individual actors. The coefficient of the variable itself only refers to those initiatives that are neither entrepreneurial, nor transgovernmental, nor have NGO members.

Table 2 shows that in the absence of country targets, the overall association of entrepreneurial initiatives with a mitigation-oriented design tends to be negative. Regression (2) for instance, indicates that the probability that entrepreneurial initiatives meet at least two out of our four basic criteria is 10% lower than for other initiatives. The existence of a country target does not seem to matter much in this context as all interaction terms are insignificant. The overall negative assessment is consistent with other evaluations of voluntary agreements of companies that have been found mostly to represent business as usual (Baranzini and Thalmann 2004) or to focus on the least costly measures that still guarantee recognition by the market (Berliner and Prakash 2015). The findings are also in line with hypothesis 1 that expected no mitigation-oriented design for stand-alone entrepreneurial initiatives. Yet, hypothesis 2 suggested a more strongly mitigation-oriented design for complementary initiatives. At least on the basis of our proxy for national regulation, we find no evidence for this.

However, in our estimations, the negative association is not homogeneous across all criteria. Entrepreneurial initiatives seem to do relatively well regarding the specification of mitigation targets, which is the least frequently met criterion otherwise. In addition there are individual entrepreneurial activities that score really highly, so that there is no significant effect with respect to the '3 criteria met' indicator.

Table 2 about here

As opposed to entrepreneurial initiatives, in the absence of domestic regulation, transgovernmental initiatives are clearly positively associated with the initiatives' mitigation orientation. The coefficient is significant and positive for all three aggregated indicators 'sum of criteria', '2 criteria met' and '3 criteria met'. However, if there is a domestic target, the effect is reversed. It seems that, in line with hypothesis 4, transgovernmental actors compensate (at least partly) for a lack of regulation by generating their own, mitigation-oriented TCG initiatives. When there is a national target they do not seem to see the requirement for their own engagement any more. We expected the stronger design in cases of missing domestic regulation, but we did expect that some (albeit weak) positive correlation would remain even when national regulation is functioning (hypothesis 3). This cannot be observed in our data. Interestingly, with respect to the incentives-related sub-indicator (regression (5)) the relationship is reverse. Apparently, sub-national entities engage in incentive-based initiatives in a way that complements domestic regulation. Maybe in this specific context, the intention is to financially support private companies in the sub-national constituencies in meeting the requirements of national regulation.

Again in line with our theoretical argument (hypotheses 5 and 6), initiatives including NGOs tend to show similar characteristics as transgovernmental initiatives. While the association is less clearly significant, there is evidence for a positive effect of NGO participation when there is no country target [the overall effect is significant for '3 criteria met' (see regression (3) and primarily works through a higher share of incentive-based mechanisms (see regression (5))], and a reversal of this effect indicated by negative coefficients of similar size when such a country target is present.

In sum, we observe that, as opposed to entrepreneurial initiatives where stand-alone initiatives are negatively associated with mitigation-oriented design, stand-alone initiatives of sub-national entities and NGOs show a stronger mitigation-oriented design than complementary initiatives. This is in line with our theoretical predictions. Results are confirmed by the analysis presented in the online appendix.

Table 3 presents a similar analysis with respect to international regulation. Our indicators for functional international regulation ('Kyoto operational') and the lack thereof ('Post Copenhagen') are therefore interacted with the three actor-related variables. A positive interaction term with 'Kyoto operational' and a negative interaction term with 'Post Copenhagen' indicate that the actors tended to initiate TCG initiatives with a relatively clear mitigation-oriented design as a complement to functioning international rules, while the reversed signs indicate a stronger mitigation-oriented design for stand-alone initiatives.

Table 3 about here

Examining entrepreneurial initiatives first, we find indications of complementarity with significant coefficients in regressions (1) for 'sum of criteria', (4) for mitigation targets, and (7) for MRV (where, however, only the negative coefficient for the interaction term with 'Post Copenhagen' is significant). This provides some confirmation for our theoretical argument that private companies come up with effectively designed initiatives when rules and regulation lead them to expect that some costly action is unavoidable. While we did not find this effect with respect to domestic regulation, the effect with respect to international regulation appears quite clear. This provides support for hypothesis 2, at least regarding the international level.

In contrast, just as in the context of national regulation, transgovernmental initiatives with a mitigation-oriented design rather tend to emerge when regulation is perceived to be lacking at the international level. While transgovernmental TCG initiatives did not stand out for particular effectiveness during the high time of the Kyoto Protocol, we find some positively significant coefficient estimates for these initiatives during the post-Copenhagen period (see regression (1) for 'sum of criteria' and regression (4) for the definition of mitigation targets). These results indicate more stand-alone initiatives with mitigation-oriented designs when the UNFCCC process seemed to stall. The substantial effect on 'sum of criteria' is strong indicating that on average, after the Copenhagen summit, newly initiated transgovernmental TCG initiatives met over one criterion more than in earlier periods (the reference period is the period before 2005). These results are again in line with our theoretical arguments, namely hypothesis 4. Only for initiatives with strong NGO membership, we do not find any significant effects, so that hypothesis 6 cannot be confirmed at the international level. As before results are generally confirmed by the regressions with further control variables in the online appendix, although results for entrepreneurial initiatives are somewhat less significant, while results for transnational ones are even more significant than presented here.

We finally come back to the role of national governments' or international organizations' orchestration. As already mentioned earlier, the role of governments in getting the initiatives started has a robust positive effect on designs oriented towards effective mitigation. Beyond this, we do not find any specific effects for international organizations initiating TCG initiatives(results not shown). However, when we look at the second component of orchestration, namely shaping or influencing the development of an initiative beyond its creation, we find a number of interesting correlations (see Table 4). In particular, the interaction term with the 'Post Copenhagen' dummy is generally large, positive, and highly significant. This is consistent with an attempt of national governments and/or international organizations to compensate for the insufficiency of

international regulation by supporting stand-alone TCG initiatives, and thereby confirms hypothesis 8. Only with respect to the incentive criterion, the effect is quite different (see regression (5)). It appears that in this context, shaping was relatively most successful in the period before Kyoto became operational, while other, non-shaped initiatives focused more on incentives thereafter.[3]

Given that the World Bank is a major player in the orchestration of TCG initiatives, one might imagine that the strong effect of shaping for the mitigation-orientation of stand-alone initiatives is driven by the Bank's interventions. To test this, we also interact the period dummies with the dummy for the World Bank as the founding agent. It becomes clear that the increasing focus on a mitigation-oriented design in the post-Copenhagen period is not due to World Bank engagement. At the exception of the mitigation target the association between World Bank founded initiatives and the design criteria met was highest in the period before Kyoto became operational, and lower both during the high time of the Kyoto Protocol and after the Copenhagen conference. All results are again confirmed by the corresponding, more complete regression table in the online appendix.

Table 4 about here

In sum, our empirical results are largely in line with theoretical expectations. There is no evidence for any kind of stand-alone moves by private firms towards TCG initiatives with a mitigation-oriented design, but some evidence for related activities in response to international regulation (in line with hypotheses 1 and 2). In contrast, some attempts to establish mitigation-oriented stand-alone initiatives when national and international regulation is missing (or insufficient) can be observed by sub-national governments (transgovernmental initiatives) and NGOs (the latter only at national level). This is in line with hypotheses 4 and 6, while the generally positive (albeit weak) effect of these membership groups on the design of TCG initiatives cannot be observed (no support for hypotheses 3 and 5). Moreover, hypothesis 7 on orchestration is confirmed with respect to the initiating role of governments, and hypothesis 8 on orchestration for stand-alone initiatives is confirmed with respect to shaping.

[3] Given our focus on institutional design, it may be surprising to see that – at least regarding the influence of international organizations – shaping has a stronger role here than initiating although it refers to a later period in the life of the institution. We assume that this is related to some influence the relevant organizations may have had right from the beginning even though they did not join the initiative as a founding member.

What does this imply in terms of the questions posed above? Can we expect TCG initiatives to support governments' efforts to reach their NDCs or even to go beyond that and hence contribute to closing the gap remaining between the sum of NDCs and the emission reductions necessary to remain below the 2° target as agreed in Paris? Since convincing entrepreneurial initiatives are primarily reactive to existing international regulation, it can be expected that they will also respond to the Paris Agreement and help implementing related domestic policies in an efficient way. Transgovernmental initiatives and initiatives with NGO members may wish to go beyond that by building up mitigation-oriented stand-alone initiatives if they feel that the existing national and international regulation is not far-reaching enough. This could help to fill the remaining emissions gap. However, given the generally very weak design of TCG initiatives when it comes to the basic criteria mitigation target, incentives, baseline and MRV, our results do not suggest that their contribution will be substantial.

Conclusions

While the Paris Agreement is a breakthrough in the multilateral climate negotiation process under the UNFCCC, its target of keeping global warming well below 2°C is not consistent with the sum of the national emission reduction pledges. Thus transnational climate governance initiatives are seen by many observers as opportunities to close this gap, and to be an "add-on" to the insufficient mitigation effort of national governments. Is this really the case or is the role of such initiatives rather a complementary one so that we can expect them to contribute to emission reduction only in combination with existing regulation at the international and domestic level? Under which conditions can these initiatives be expected to achieve any mitigation at all?

We assess 109 transnational initiatives through a simple design indicator that is determined by the existence of a mitigation target, the provision of incentives for mitigation, the specification of a baseline from which mitigation is determined, and the existence of provisions for MRV of mitigation. About half of the initiatives do not fulfil any of these basic criteria, while about 13% meet three of them. Only one initiative satisfies all four criteria. As the different criteria are complementary, meeting several of them simultaneously is necessary for a convincing design. The main purpose of most initiatives is simply some networking. This is a rather sobering result to start with and does not suggest that these initiatives will provide any significant contribution to closing the emissions gap. This is true unless – as suggested by a more social-constructionist literature – they develop some internal dynamics that drive them to become effective despite their initial design and the initial intentions of their members. We do not believe that this is very plausible in our context.

While some stand-alone mitigation-oriented initiatives can be found among transgovernmental initiatives and initiatives with NGO participation, entrepreneurial initiatives tend to show a convincing design only in response to international regulation. Indeed the few cases of effective entrepreneurial activities (meeting more than two of the above criteria) can be seen as complementary to regulation under the Kyoto Protocol.

Some other variables are statistically linked to our indicators of mitigation-related design. Initiatives orchestrated by governments or international institutions focus more on incentives but are lacking mitigation targets. Generally, government support in setting up an initiative is positively linked to a mitigation-oriented design. As far as stand-alone initiatives are concerned, we find no specifically positive effect of initiation, but of shaping by international organization and national governments.

In sum, the ambition of transnational climate governance initiatives is way too low to close the emissions gap under the Paris Agreement. This holds for all types of initiatives, no matter whether the key actors are private firms, sub-national governments or NGOs. In addition, the initiatives' mitigation ambition often directly depends on the willingness to mitigate resulting from the international climate negotiation process (notably for entrepreneurial initiatives). While potentially useful to improve the efficiency of the implementation of existing national policies, these initiatives cannot be expected to make up for lack of country-level mitigation ambition in the UNFCCC process.

What are the implications of these findings for policy makers?

First, national governments cannot rely on other actors to do their job. As long as they hesitate to set sufficiently ambitious emission targets at the domestic level and to define appropriate policy instruments for implementation, there are little chances that the global climate change limitation target affirmed in the Paris Agreement will be met.

Second, governments have ample choice between different policy instruments. They need to provide the incentives for others to act. Whether they do so by increasing the cost for the production or consumption of emission-intensive goods and services (for example through taxes), or whether they provide funding to reward emission reductions (thereby increasing the opportunity cost for those actors who continue to generate high emissions), both can be designed in a way to internalize the negative externalities related to global warming. In the former case, governments can use their traditional policy instruments while in the latter one, they can make use of approaches that have been applied within the framework of TCG initiatives. The Pilot Auction Facility for instance, provides rewards for emission reduction projects, while the diverse carbon funds allow

governments (and other actors) to directly buy emission reduction credits. These are alternative ways to provide the same kind of incentives, but what matters is the determination and clarity of the approach. We have seen that government initiation and shaping can influence the design of TCG initiatives. But in order to reach a substantial impact, the magnitude of the financial incentives must be proportionate to the severity of the problem to solve.

There will be substantial costs of mitigation commensurate with the Paris Agreement target, and the choice between alternative policy instruments will have an impact on the distribution of wealth within the society. This is another aspect that policy makers will have to consider, but its discussion goes beyond the scope of this paper. Once the incentives for mitigation are set, government support for further activities like networking and information exchange can help private and non-private actors to achieve mitigation cost-efficiently.

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Figures and Tables

Figure 1: Share of initiatives meeting 0 to 4 basic design criteria for effective mitigation

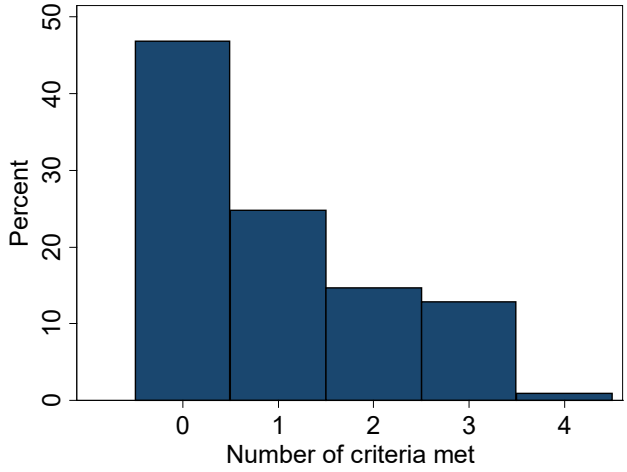
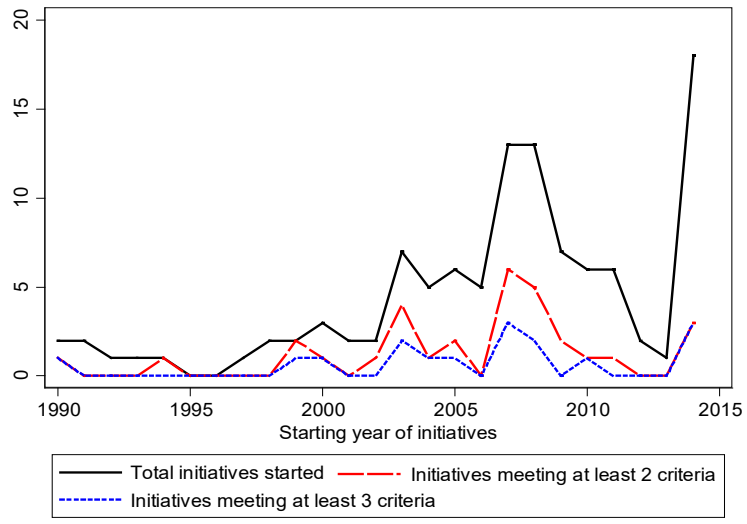


Figure 2: The development of new initiatives, overall and by number of criteria met



Notes: The y-axis shows the number of newly created initiatives. The year 2015 is omitted due to incomplete observations

Table 1: TCG initiatives by purpose

Main purpose of TCG initiatives	Number	Share
A. Mitigation		
Networking	63	57.8%
Standards	21	19.3%
Carbon funds	9	8.3%
Technology development	4	3.7%
Other	7	6.4%
B. Adaptation	5	4.6%
Total	109	100%

Table 2: Correlates of mitigation-related design – examining complementarity with national regulation

	(1) Sum of criteria	(2) 2 criteria met	(3) 3 criteria met	(4) Mitigation target	(5) Incentives	(6) Baseline	(7) MRV
Depends on gov.	1.49***	0.58***	0.77***	0.00	0.62***	0.54***	0.32**
	(0.00)	(0.00)	(0.00)	(0.98)	(0.00)	(0.00)	(0.03)
Country target	1.14*	0.35*	0.45*	0.18	0.29*	0.35	0.32
	(0.07)	(0.10)	(0.06)	(0.14)	(0.07)	(0.11)	(0.44)
Entrepreneurial	-0.14**	-0.10***	0.05	0.03*	-0.05	-0.09**	-0.02
	(0.04)	(0.00)	(0.11)	(0.10)	(0.10)	(0.02)	(0.48)
Target x Entrepr.	0.37	0.20	-0.12	0.11	0.04	0.16	0.05
	(0.24)	(0.15)	(0.27)	(0.36)	(0.37)	(0.23)	(0.58)
Transgovernmental	0.39***	0.08*	0.19***	0.18***	-0.09**	0.09**	0.20***
	(0.00)	(0.07)	(0.00)	(0.00)	(0.02)	(0.03)	(0.00)
Target x Transg.	-0.65*	-0.15	-0.24***	-0.21*	0.21**	-0.16	-0.49***
	(0.07)	(0.19)	(0.00)	(0.08)	(0.05)	(0.15)	(0.01)
NGO members	0.32	0.06	0.21*	0.06	0.18***	0.09	-0.01
	(0.15)	(0.34)	(0.10)	(0.13)	(0.00)	(0.41)	(0.91)
Target x NGOs	-0.42	-0.04	-0.19	-0.11*	-0.16**	-0.10	-0.05
	(0.18)	(0.57)	(0.17)	(0.07)	(0.01)	(0.36)	(0.85)
Structure	-0.36***	-0.16**	-0.01	0.04	-0.04	-0.17**	-0.20***
	(0.00)	(0.03)	(0.80)	(0.11)	(0.46)	(0.04)	(0.00)
Adaptation focus	-0.82	-0.26	-0.21	-0.06	-0.14	-0.24	-0.38*
	(0.12)	(0.20)	(0.14)	(0.17)	(0.44)	(0.20)	(0.07)
EU	1.21***	0.36***	0.42***	0.89***	-0.16	0.35***	0.14
	(0.01)	(0.00)	(0.00)	(0.00)	(0.15)	(0.00)	(0.39)
WB	0.50	0.18	0.13	0.07	0.29	0.08	0.05
	(0.45)	(0.40)	(0.61)	(0.47)	(0.11)	(0.72)	(0.89)
INT	0.61	0.24	0.24	0.00	0.32**	0.20	0.09
	(0.30)	(0.18)	(0.27)	(0.98)	(0.04)	(0.23)	(0.82)
Year	-0.02	-0.00	-0.00	-0.00	-0.01	-0.00	-0.02**
	(0.18)	(0.82)	(0.82)	(0.92)	(0.13)	(0.99)	(0.03)
Constant	47.38	3.97	2.92	1.35	13.98	0.58	31.47**
	(0.17)	(0.81)	(0.84)	(0.93)	(0.13)	(0.97)	(0.03)
Adj. R2	0.46	0.39	0.45	0.15	0.50	0.36	0.34
N	109	109	109	109	109	109	109

Notes: Linear regression models with p-values in parentheses based on robust standard errors (heteroscedasticity consistent and clustered by founding country);

***, ** and * indicate significance at the 1%-, 5%- and 10%-level respectively. Variable names are abbreviated in interaction terms: Country target → Target, Entrepreneurial → Entrepr., Transgovernmental → Transg., NGO members → NGOs.

Transnational Climate Governance Initiatives: Designed for Effective Climate Change Mitigation?

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ONLINE APPENDIX

Part I: Variable description

Part I: Methodological considerations

Part III: Complementary regression results

Online Appendix I: Variable description

Table A1: Descriptive statistics, sources and explanations

Variable	Obs.	Mean	Std. Dev.	Min	Max	Variable description	Sources
Sum of criteria	109	0.96	1.10	0	4	Total number of individual design criteria met	Authors
2 criteria met	109	0.28	0.45	0	1	Dummy=1 if at least 2 criteria met, otherwise=0	Authors
3 criteria met	109	0.15	0.36	0	1	Dummy=1 if at least 3 criteria met, otherwise=0	Authors
Mitigation target	109	0.11	0.31	0	1	Dummy=1 if initiative has defined a mitigation target, otherwise=0	Authors
Incentives	109	0.13	0.34	0	1	Dummy=1 if initiative provides a financial incentive for mitigation, otherwise=0	Authors
Baseline	109	0.27	0.44	0	1	Dummy=1 if initiative has specified a baseline for mitigation, otherwise= 0	Authors
MRV	109	0.46	0.50	0	1	Dummy=1 if initiative includes a MRV system, otherwise=0	Authors
Depends on gov.	109	0.15	0.36	0	1	Dummy =1 if start of initiative depended on national government action usually as a founding member, but also if initiative specifically refers to national government policies (whether in favor of climate policy or not), otherwise=0	Authors
Country target	60	0.95	0.22	0	1	Mitigation target of the founding country: no or "inadequate" target=0, otherwise=1, whereby "inadequate" is defined as: "if all governments put forward inadequate positions warming likely to exceed 3–4°C"; missing for WB and INT	Ecofys et al. (2014)
Structure	109	2.33	0.93	1	3	Centralized=1, coordinated=2, decentralized=3 (networks)	Authors
Adaptation focus	109	0.05	0.21	0	1	Dummy=1 if initiative focuses primarily on adaptation, otherwise=0	Authors
Entrepreneurial	109	0.33	0.47	0	1	Dummy=1 if non-state actors played the leading role in creating the initiative (in practice, non-state actors in this context are primarily firms and business association, but in some cases also NGOs), otherwise=0	Roger et al. (2015), updated by the authors
Transgovernmental	109	0.15	0.36	0	1	Dummy=1 if only sub-state actors (cities or sub-national governments) were responsible for the creation of the initiative, otherwise=0	Roger et al. (2015), updated by the authors
NGO members	109	0.53	0.50	0	1	Dummy=1 if the initiative has NGO members, otherwise=0	Authors
Shaping	109	0.05	0.21	0	1	Dummy=1 if there was an active role of national government(s) or international organization in shaping the initiative, e.g., by influencing the initiative's rules and activities and/or by providing resources after the start of the initiative, otherwise=0.	Roger et al. (2015), updated by the authors
Kyoto operational	109	0.40	0.49	0	1	Dummy=1 if 2005<=year>=2009, otherwise=0	
Post Copenhagen	109	0.31	0.47	0	1	Dummy=1 if year>2009, otherwise=0	
GCF	58	21.56	4.26	14.97	47.58	Gross capital formation (% of GDP) in founding country; missing for EU, WB and INT	World Bank (2015)
Energy efficiency	58	8.58	2.91	4.01	17.32	GDP per unit of energy use (constant 2011 PPP $ per kg of oil equivalent) in founding country; missing for EU, WB and INT	World Bank (2015)
Emissions pc	58	15.14	6.78	1.63	29.79	Total greenhouse gas emissions including forestry (tCO_2eq per capita) in founding country; missing for EU, WB and INT	World Resources Institute (2015)
Election year	58	0.41	0.50	0	1	Dummy=1 if start year coincides with major legislative or presidential election in the founding country, otherwise=0; missing for EU, WB and INT	Beck et al. (2001), updated by World Bank (2013) and by the authors
No of initiatives	109	8.82	5.63	1	18	Total number of initiatives started per year	Roger et al. (2015), updated by the authors
EU	109	0.02	0.13	0	1	Dummy=1 if initiative founded by the EU, otherwise=0	Authors
WB	109	0.12	0.33	0	1	Dummy=1 if initiative founded by the World Bank, otherwise=0	Authors
INT	109	0.33	0.47	0	1	Dummy=1 if initiative founded by actors from different countries (international, no lead country) , otherwise=0	Authors
year	109	2007	5.88	1990	2015	Starting year of the initiative	Roger et al. (2015), updated and adjusted by the authors

Notes: "Founding country" refers to the country in which the initiative was founded or in which the founding actor is located. However, the location of international organizations is not considered in this context (e.g., the United States does not count as a founding country for initiatives launched by the World Bank). The qualitative variable "founding country" contains separate categories for the World Bank, the EU and other international organizations (INT). Variables referring to founding countries have no observations for WB, EU and INT (at the exception of the country target that is defined for the EU). Otherwise, data are complete as missing values were imputed by linear inter- or extrapolation. In all multivariate estimations, missing values of country-related variables for WB, EU and INT were replaced by 0 to avoid considerable loss of observations. This is why all estimations also include dummy variables for these three international actors. Country characteristics always refer to the founding country and the starting year of the initiative.
When "Authors" is indicated as the data source, the data has been collected through a web search on the websites of the individual initiatives listed in the Roger et al. (2015) TCG dataset and additional initiatives added by the authors following the criteria in Roger et al. (2015).

Online Appendix II: Methodological considerations

As all dependent variables are categorical, a discussion of the appropriate statistical model seems of order. 'Sum of criteria' is a count variable with values between zero and four, and '2 criteria met', '3 criteria met' as well as the individual variables for each of the criteria are binary indicators. One could hence consider a Poisson or negative binomial model for 'sum of criteria' and logit or probit models for the other dependent variables. In terms of the goodness of fit statistics, Poisson seems to work fine (no indication of overdispersion). This led us to carry out a set of initial regressions using Poisson and Probit models. However, the Poisson model is conceptually problematic here because it implicitly assumes that the count of positive events (here the number of criteria met) could go towards infinity. A more appropriate alternative could hence be an ordered probit model. Based on our data, its results are similar in terms of the sign and significance of the coefficients.

However, there are a number of problems with these specifications. First, the results of non-linear models are difficult to interpret in a setting with (multiple) interaction terms. As shown by Ai and Norton (2003) for probit and logit models, not even the size and significance of interaction terms can be directly interpreted. It is obviously possible to separately compute the difference in predicted probability for any combinations of initial conditions, and hence the marginal effects. However, given that not only the dependent variables, but also the explanatory variables are mostly categorical, not all the combinations of initial conditions actually exist in the data. Moreover, depending on the dependent variable, some variable combinations perfectly determine the outcome so that they are dropped from the model along with the corresponding observations. While this is fine for the interpretation of the individual model, it leads to different specifications and different samples depending on the dependent variable thereby impeding comparisons across models. Finally, the structure of the data suggests that there might be multiple correlations between the error terms due, for instance, to the participation of the same actors in different initiatives. Binary response models are inconsistent in this case, and "robust" estimation cannot mitigate the problem (Greene 2002, p. 673f.).

To avoid these problems and to facilitate the presentation of results, we hence proceed with simple linear models in the following. The use of linear probability models has by now become very common as the only major problem, namely the occurrence of heteroscedasticity, can be easily healed through the use of robust estimators. Regarding the 'sum of criteria' an additional concern could be that the steps from one category to the next (meaning from meeting one criterion, to two, to three, to four) might not be equally 'distant' as a linear model would assume. However, these distances can be checked from the cut-offs of individual categories in the ordered probit, and the result gives us some confidence to proceed with the linear model. In all models, we use heteroscedasticity consistent error terms that are also clustered by founding country (or organization), i.e., based on the place where the initiative was founded or where the founding actor was located. We further carry out some robustness checks first by omitting the five adaptation initiatives, and second by merging the observations with 3 and 4 criteria met to a single category for the dependent variable 'sum of criteria'. Changes are minimal, so that we only report the outcomes of our main regressions here.

Online Appendix III: Complementary regression results

Table A2: Correlates of mitigation-related design – examining complementarity with national regulation

	(1) Sum of criteria	(2) 2 criteria met	(3) 3 criteria met	(4) Mitigation target	(5) Incentives	(6) Baseline	(7) MRV
Depends on gov.	1.66***	0.59***	0.79***	-0.05	0.65***	0.58***	0.47***
	(0.00)	(0.00)	(0.00)	(0.76)	(0.00)	(0.00)	(0.00)
Country Target	1.25**	0.38**	0.43**	0.24*	0.29**	0.37**	0.36
	(0.01)	(0.02)	(0.02)	(0.07)	(0.05)	(0.04)	(0.28)
Entrepreneurial	-0.10	-0.06**	0.07*	0.03	-0.05	-0.06*	-0.00
	(0.32)	(0.02)	(0.07)	(0.30)	(0.22)	(0.08)	(0.96)
Target x Entrepr.	0.40	0.22*	-0.13	0.08	0.04	0.19	0.10
	(0.22)	(0.09)	(0.28)	(0.51)	(0.66)	(0.17)	(0.23)
Transgovernmental	0.45***	0.10**	0.20***	0.19***	-0.09**	0.11***	0.23***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.02)	(0.01)	(0.00)
Target x Transg.	-0.79**	-0.16*	-0.25***	-0.28**	0.19*	-0.17*	-0.53**
	(0.02)	(0.08)	(0.00)	(0.02)	(0.05)	(0.09)	(0.02)
NGO members	0.28	0.04	0.19	0.07*	0.18***	0.07	-0.04
	(0.24)	(0.55)	(0.15)	(0.08)	(0.00)	(0.56)	(0.71)
Target x NGOs	-0.33	-0.02	-0.15	-0.11*	-0.14*	-0.08	-0.01
	(0.38)	(0.84)	(0.33)	(0.06)	(0.06)	(0.58)	(0.98)
GCF	-0.01	0.00	-0.01**	-0.01	-0.01	0.00	0.00
	(0.57)	(0.26)	(0.04)	(0.32)	(0.25)	(0.51)	(0.98)
Energy efficiency	-0.17***	-0.07***	-0.04**	-0.01	-0.01	-0.06***	-0.08***
	(0.00)	(0.00)	(0.01)	(0.51)	(0.52)	(0.00)	(0.00)
Emissions pc	-0.06**	-0.02**	-0.01**	0.01	-0.01	-0.02**	-0.04***
	(0.02)	(0.04)	(0.03)	(0.52)	(0.31)	(0.02)	(0.01)
Election year	-0.15	-0.05	0.07	-0.15	0.02	-0.01	-0.01
	(0.68)	(0.70)	(0.54)	(0.32)	(0.82)	(0.89)	(0.88)
No of initiatives	0.01	0.01	0.01**	-0.00	-0.00	0.01	0.00
	(0.60)	(0.17)	(0.03)	(0.62)	(0.98)	(0.21)	(0.64)
Structure	-0.32***	-0.14**	-0.01	0.05	-0.04	-0.16**	-0.18***
	(0.00)	(0.02)	(0.73)	(0.13)	(0.47)	(0.04)	(0.00)
Adaptation focus	-0.81	-0.27	-0.28	-0.03	-0.15	-0.25	-0.37
	(0.22)	(0.24)	(0.11)	(0.61)	(0.48)	(0.20)	(0.14)
EU	-1.19	-0.41	-0.31	0.75***	-0.45*	-0.44	-1.04*
	(0.17)	(0.16)	(0.24)	(0.01)	(0.09)	(0.13)	(0.05)
WB	-2.03**	-0.54*	-0.62**	-0.05	-0.05	-0.69**	-1.24
	(0.05)	(0.07)	(0.03)	(0.90)	(0.87)	(0.04)	(0.10)
INT	-1.85*	-0.52*	-0.51*	-0.16	0.01	-0.58**	-1.12
	(0.06)	(0.06)	(0.07)	(0.63)	(0.98)	(0.04)	(0.12)
Year	-0.02	-0.00	-0.00	0.00	-0.01	-0.00	-0.01
	(0.50)	(0.78)	(0.65)	(0.84)	(0.17)	(0.95)	(0.22)
Constant	35.13	7.14	8.04	-4.53	12.41	2.22	25.02
	(0.46)	(0.75)	(0.64)	(0.84)	(0.16)	(0.92)	(0.18)
Adj. R2	0.48	0.41	0.46	0.16	0.48	0.37	0.36
N	109	109	109	109	109	109	109

Note: Linear regression models with p-values in parentheses based on robust standard errors (heteroscedasticity consistent and clustered by founding country); ***, ** and * indicate significance at the 1%-, 5%- and 10%-level respectively. Variable names are abbreviated in interaction terms: Country target → Target, Entrepreneurial → Entrepr., Transgovernmental → Transg., NGO members → NGOs.

Table A3: Correlates of mitigation-related design – examining complementarity with international regulation

	(1) Sum of criteria	(2) 2 criteria met	(3) 3 criteria met	(4) Mitigation target	(5) Incentives	(6) Baseline	(7) MRV
Depends on gov.	1.59***	0.56***	0.71***	-0.02	0.60***	0.52***	0.49***
	(0.00)	(0.00)	(0.00)	(0.85)	(0.00)	(0.00)	(0.00)
Country Target	1.18***	0.41**	0.35**	0.20	0.24*	0.39***	0.35
	(0.01)	(0.02)	(0.02)	(0.25)	(0.06)	(0.01)	(0.22)
Kyoto operational	-0.26	0.00	-0.20	-0.14	-0.05	-0.18	0.11
	(0.65)	(0.99)	(0.27)	(0.45)	(0.74)	(0.66)	(0.66)
Post Copenhagen	0.21	0.13	-0.01	-0.07	0.00	0.02	0.26
	(0.75)	(0.71)	(0.96)	(0.77)	(0.99)	(0.96)	(0.54)
Entrepreneurial	0.09	0.08	-0.12	0.08	-0.11	-0.06	0.18
	(0.77)	(0.66)	(0.30)	(0.50)	(0.31)	(0.81)	(0.23)
Kyoto x Entrepr.	0.76	0.22	0.14	0.18*	0.08	0.36	0.14
	(0.12)	(0.27)	(0.37)	(0.07)	(0.64)	(0.17)	(0.71)
Copenh. x Entrepr.	-0.41	-0.10	0.10	-0.21	0.11	0.04	-0.35
	(0.11)	(0.58)	(0.35)	(0.17)	(0.18)	(0.86)	(0.10)
Transgovernmental	-0.92	-0.21	-0.32	-0.15	-0.03	-0.29	-0.45
	(0.13)	(0.45)	(0.27)	(0.48)	(0.83)	(0.33)	(0.17)
Kyoto x Transg.	1.24	0.34	0.59	0.12	0.20	0.50	0.42
	(0.16)	(0.34)	(0.13)	(0.57)	(0.36)	(0.25)	(0.31)
Copenh. x Transg.	1.43**	0.31	0.45*	0.44*	0.01	0.37	0.62*
	(0.02)	(0.24)	(0.07)	(0.07)	(0.97)	(0.16)	(0.06)
NGO members	0.23	0.17	0.04	-0.02	0.17	0.06	0.02
	(0.64)	(0.38)	(0.85)	(0.91)	(0.19)	(0.80)	(0.90)
Kyoto x NGOs	-0.17	-0.20	0.10	0.07	-0.02	-0.05	-0.17
	(0.72)	(0.46)	(0.62)	(0.76)	(0.83)	(0.88)	(0.21)
Copenh. x NGOs	-0.36	-0.20	-0.01	-0.05	-0.17	-0.11	-0.03
	(0.50)	(0.40)	(0.96)	(0.73)	(0.22)	(0.69)	(0.91)
GCF	0.02	0.01*	-0.01	0.00	-0.01	0.01	0.02
	(0.26)	(0.06)	(0.35)	(0.82)	(0.26)	(0.13)	(0.33)
Energy efficiency	-0.13***	-0.06***	-0.03***	-0.00	-0.01	-0.05***	-0.06**
	(0.00)	(0.00)	(0.00)	(0.92)	(0.23)	(0.00)	(0.03)
Emissions pc	-0.05**	-0.02**	-0.01**	0.01	-0.01	-0.02*	-0.03**
	(0.02)	(0.05)	(0.02)	(0.49)	(0.14)	(0.08)	(0.02)
Election year	-0.13	-0.04	0.11	-0.17	0.01	0.00	0.03
	(0.73)	(0.77)	(0.40)	(0.34)	(0.94)	(1.00)	(0.69)
No of initiatives	0.02	0.01**	0.01**	-0.00	0.00	0.01*	0.01*
	(0.18)	(0.04)	(0.02)	(0.92)	(0.99)	(0.06)	(0.09)
Structure	-0.23	-0.11	-0.03	0.08**	-0.02	-0.13	-0.16**
	(0.17)	(0.16)	(0.70)	(0.03)	(0.74)	(0.18)	(0.03)
Adaptation focus	-0.65	-0.22	-0.24*	0.02	-0.15	-0.21	-0.31
	(0.23)	(0.29)	(0.08)	(0.62)	(0.46)	(0.16)	(0.16)
EU	-0.19	-0.14	-0.11	1.04***	-0.53*	-0.14	-0.56
	(0.80)	(0.56)	(0.55)	(0.00)	(0.09)	(0.63)	(0.40)
WB	-0.74	-0.15	-0.34	0.25	-0.18	-0.24	-0.57
	(0.38)	(0.65)	(0.17)	(0.59)	(0.64)	(0.56)	(0.49)
INT	-0.59	-0.17	-0.22	0.17	-0.18	-0.17	-0.42
	(0.49)	(0.57)	(0.36)	(0.69)	(0.62)	(0.64)	(0.60)
Year	-0.05	-0.01	-0.01	-0.00	-0.00	-0.01	-0.04
	(0.21)	(0.45)	(0.41)	(0.96)	(0.86)	(0.62)	(0.16)
Constant	102.71	26.97	26.35	2.03	2.51	19.63	78.53
	(0.20)	(0.44)	(0.40)	(0.96)	(0.84)	(0.60)	(0.15)
Adj. R2	0.49	0.40	0.46	0.17	0.45	0.37	0.35
N	109	109	109	109	109	109	109

Note: Linear regression models with p-values in parentheses based on robust standard errors (heteroscedasticity consistent and clustered by founding country); ***, ** and * indicate significance at the 1%-, 5%- and 10%-level respectively. Variable names are abbreviated in interaction terms: Kyoto operational → Kyoto, Post Copenhagen → Copenh., Entrepreneurial → Entrepr., Transgovernmental → Transg., NGO members → NGOs.

Table A4: Correlates of mitigation-related design – examining 'shaping' in conjunction with international regulation

	(1) Sum of criteria	(2) 2 criteria met	(3) 3 criteria met	(4) Mitigation target	(5) Incentives	(6) Baseline	(7) MRV
Depends on gov.	1.19***	0.40***	0.75***	-0.12	0.60***	0.41***	0.30***
	(0.00)	(0.00)	(0.00)	(0.30)	(0.00)	(0.00)	(0.01)
Country Target	1.07**	0.38***	0.32**	0.22*	0.22	0.32***	0.32
	(0.01)	(0.00)	(0.04)	(0.10)	(0.10)	(0.00)	(0.23)
Kyoto operational	0.15	0.04	0.01	-0.06	0.02	0.09	0.11
	(0.75)	(0.82)	(0.96)	(0.34)	(0.83)	(0.59)	(0.73)
Post Copenhagen	0.16	0.06	0.07	-0.07	-0.03	0.10	0.16
	(0.79)	(0.81)	(0.73)	(0.68)	(0.82)	(0.64)	(0.74)
Shaping	0.11	0.03	0.21	-0.20**	0.38***	0.09	-0.16
	(0.80)	(0.86)	(0.32)	(0.03)	(0.00)	(0.53)	(0.50)
Kyoto x Shaping	-0.73	-0.08	-0.31	0.16	-0.45***	-0.15	-0.29
	(0.32)	(0.73)	(0.27)	(0.11)	(0.01)	(0.52)	(0.42)
Copenh. x Shaping	1.77***	1.05***	-0.19	0.15*	-0.42***	0.99***	1.04***
	(0.00)	(0.00)	(0.37)	(0.09)	(0.00)	(0.00)	(0.00)
Kyoto x WB	-1.20***	-0.47***	-0.44***	0.11**	-0.06	-0.88***	-0.37*
	(0.00)	(0.00)	(0.00)	(0.03)	(0.21)	(0.00)	(0.09)
Copenh. x WB	-0.75**	-0.41***	-0.07	0.01	-0.01	-0.44***	-0.31
	(0.02)	(0.00)	(0.58)	(0.93)	(0.92)	(0.00)	(0.17)
GCF	-0.00	0.00	-0.01	-0.01	-0.01*	0.00	0.01
	(0.97)	(0.41)	(0.28)	(0.43)	(0.05)	(0.73)	(0.28)
Energy efficiency	-0.18***	-0.07***	-0.04***	-0.01	-0.02	-0.07***	-0.08***
	(0.00)	(0.00)	(0.00)	(0.65)	(0.13)	(0.00)	(0.01)
Emissions pc	-0.06**	-0.02*	-0.01**	0.01	-0.01*	-0.02**	-0.04***
	(0.02)	(0.07)	(0.01)	(0.38)	(0.06)	(0.02)	(0.01)
Election year	-0.12	-0.05	0.11	-0.16	0.04	-0.02	0.01
	(0.80)	(0.73)	(0.44)	(0.35)	(0.76)	(0.90)	(0.91)
No of initiatives	0.02	0.02***	0.01**	-0.00	0.00	0.02***	0.01
	(0.14)	(0.01)	(0.04)	(0.68)	(0.99)	(0.01)	(0.14)
Structure	-0.42***	-0.18***	-0.03	0.02	-0.02	-0.19***	-0.22***
	(0.00)	(0.00)	(0.39)	(0.34)	(0.63)	(0.00)	(0.00)
Adaptation focus	-0.82	-0.29	-0.20*	-0.08	-0.16	-0.21**	-0.37*
	(0.12)	(0.15)	(0.08)	(0.14)	(0.50)	(0.04)	(0.06)
EU	-1.65**	-0.57*	-0.31	0.66**	-0.49**	-0.64**	-1.19**
	(0.04)	(0.06)	(0.17)	(0.04)	(0.03)	(0.03)	(0.03)
WB	-1.18	-0.16	-0.45	-0.03	-0.13	-0.29	-0.73
	(0.18)	(0.56)	(0.18)	(0.94)	(0.46)	(0.32)	(0.32)
INT	-1.90**	-0.58**	-0.44	-0.10	-0.17	-0.71***	-0.91
	(0.05)	(0.03)	(0.11)	(0.77)	(0.41)	(0.01)	(0.19)
Year	-0.04	-0.01	-0.01	0.00	-0.00	-0.01	-0.03
	(0.44)	(0.56)	(0.62)	(0.82)	(0.92)	(0.54)	(0.43)
Constant	73.57	21.56	17.38	-8.41	1.80	23.71	56.47
	(0.42)	(0.54)	(0.61)	(0.82)	(0.90)	(0.52)	(0.42)
Adj. R2	0.50	0.46	0.45	0.11	0.44	0.47	0.38
N	109	109	109	109	109	109	109

Note: Linear regression models with p-values in parentheses based on robust standard errors (heteroscedasticity consistent and clustered by founding country); ***, ** and * indicate significance at the 1%-, 5%- and 10%-level respectively. Variable names are abbreviated in interaction terms: Kyoto operational → Kyoto, Post Copenhagen → Copenh.